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ABSTRACT

The long-term effects of employment during high school were analyzed by using National Longitudinal Survey of Youth data on 1,067 students who were initially interviewed in 1979 and who remained in the survey sample through 1991. Hours worked by respondents during the week prior to the survey date in their sophomore, junior, and senior years of high school were analyzed in relation to employment consequences 6-9 years after their scheduled data of graduation. A regression analysis was performed that controlled for standard demographic variables and potentially important characteristics (including respondent's school attitudes, smoking/drug use, religion, and family's ethnic/educational/income characteristics). No harmful effects of employment during high school were discovered; rather, students employed during their senior year earned 20% more annually and 10% higher hourly wages 6-9 years after high school graduation than did students not employed during high school. The favorable effects of low to moderate amounts of employment in the senior year persisted after controlling for a comprehensive set of background characteristics. Although the analysis does point to a negative relationship between senior year employment and educational attainment, the predicted effect is extremely small--working 20 hours per week was associated with a reduction in schooling of less than 2 months. (Fourteen tables and 43 references are included. Appended are three tables detailing sample characteristics and regression estimates.) (MN)

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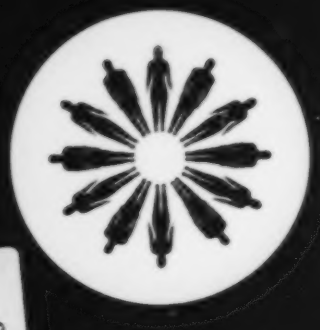

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# National Longitudinal Surveys

U.S. Department of Labor
Bureau of Labor Statistics

## Discussion Paper

High School Employment: Consumption or Investment

Christopher J. Ruhm

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# High School Employment: Consumption or Investment

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## Is High School Employment Consumption or Investment?

### 1. Introduction

During the middle 1970s, a number of prestigious commissions convened to study the problems of adolescents (e.g. President's Science Advisory Committee, 1974; National Commission on the Reform of Secondary Education, 1973; National Panel on High Schools and Adolescent Education, 1975) reached the common conclusion that additional early work experience would foster the development of personal responsibility, smooth the transition from youth to adulthood, and improve educational performance and occupational attainment. Shortly thereafter, a number of federal initiatives (e.g. the Career Education Incentive Act of 1977) were passed with the goal of increasing the employment experience of youths.

These recommendations were made in the absence of any hard empirical evidence that increased job-holding causes or even is correlated with favorable outcomes. Economic theory also fails to provide unambiguous predictions concerning the efficacy of youth employment. For example, the human capital model identifies both potential benefits and costs of working. On the one hand, time devoted to jobs could detract from potentially more productive educational investments. On the other, the employment might provide skills and knowledge which increase future productivity and complement in-class learning.[1] Early work experience could also speed the process by which youths obtain positions where there is a good match between job requirements and worker qualifications.[2]

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[1] Similarly, sociologists have suggested zero-sum models whereby employment is a diversion from academic pursuits and developmental models where work experiences further the total development of individuals.

[2] Topel & Ward (1992) provide evidence of frequent job changing for inexperienced workers and argue that this is an important source of wage and productivity increases.

Given these ambiguities, it is not surprising that a partial reappraisal of the benefits and costs of student employment occurred during the 1980s. The seminal research of Greenberger & Steinberg and their co-authors (Greenberger & Steinberg, 1980; Greenberger et. al. 1982; Steinberg et. al. 1982a, 1982b) indicated mixed and generally negative outcomes, leading them to conclude that "working is more likely to interfere with than enhance schooling; promotes pseudomaturity rather than maturity; is associated in certain circumstances with higher, not lower, rates of delinquency and drug and alcohol use; and fosters cynical rather than respectful attitudes toward work" (Greenberger & Steinberg, 1986: p. 235). These concerns are even more salient in light of recent evidence suggesting that youths take jobs to finance short-term consumption, rather than to enhance human capital investments.[3] They also have provided a justification for recent efforts to strengthen enforcement of the child labor provisions in the Fair Labor Standards Act.[4]

It is important to better understand the effects of high school work experience. Rates of employment by in-school youths are at historically high levels. If this job-holding has the negative effects sometimes attributed to it and, in particular, if it reduces educational attainment and academic performance, the increased work propensities could explain a portion of the wage stagnation observed over the last two decades, especially among young workers without college educations. Conversely, if early labor market experience has favorable impacts on future economic outcomes, the relatively low employment rates of nonwhite youths could contribute to racial earnings gaps observed later in life.

Previous research suffers from two fundamental shortcomings which make it difficult to determine the net benefits or costs of job-holding by students. First, most studies treat youth

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[3] For example, 69% of working high school seniors, surveyed in 1982 by the High School and Beyond Survey, report spending some of their earnings for car expenses, 97% to "buy things", but just 44% towards saving for college (Yeatts, 1994).

[4] See Brooks (1991) for a description of these efforts.

employment as an exogenous variable, ignoring the selection process determining which students work and, conditional upon doing so, how many hours they are employed. Indeed, much of the prior investigation has used unrepresentative samples and held constant few, if any, individual characteristics. Second, analysts have focused upon educational achievement and employment outcomes shortly after the completion of high school but have obtained little information on long-run labor market success.

Using data from the National Longitudinal Survey of Youth (NLSY), this paper improves in both areas. Several strategies are used to account for difficult to observe differences between workers and nonworkers. These entail controlling for an unusually comprehensive set of background characteristics, examining whether reduced form estimates are biased by the potential endogeneity of high school employment, and testing the robustness of key results to changes in samples and specifications. The dependent variables are employment consequences 6 to 9 years after the scheduled date of high school graduation, thus providing the best available information on long-term effects of the student job-holding. In addition, this study examines a wider variety of economic outcomes and utilizes better information on high school employment status than has previously been available. The investigation focuses upon the number of hours worked by high school students. Examining the role of job characteristics or of employment by college students is beyond the scope of this analysis and is reserved for future study.[5]

No evidence is uncovered of detrimental effects of low to moderate amounts of student employment. To the contrary, job-holding in the senior year is associated with substantially elevated future economic attainment, whether the latter is measured by earnings, wages, occupational status, or the receipt of fringe benefits. These results are robust across a variety

[5] See Greenberger & Steinberg (1986), Greenberger et. al. (1982) Stern & Nakata (1989), and Stern et. al. (1990) for discussion of differences in job characteristics.

of specifications and sample selection criteria and strongly suggest that employment plays an important developmental role for students as they approach the end of high school. Interestingly, the economic benefits are obtained despite a small reduction in completed schooling. This suggests that time spent on the job detracts slightly from educational human capital investments but more than compensates for this loss through employment-related training.

## 2. Prior Research

The effects of high school employment have been widely studied since the late 1970s. Most frequently, researchers have examined the impact of student work on academic performance as measured by grades, test scores, or school completion rates. Employment probabilities and wages, in the period shortly following high school completion, have also received some attention.[6] Samples, time periods, and study methodologies vary widely. The key findings of previous research are briefly summarized in table 1.

There is currently no consensus whether student employment improves or worsens school performance, although the data do suggest that any beneficial effects are maximized at low or intermediate hours of work, while harmful impacts are most likely for heavy job commitments. For example, Barone (1993), Greenberger & Steinberg (1980), Greenberger, et. al. (1982), Mortimer & Finch (1986), Steinberg & Dornbusch (1991), and Steinberg, et. al. (1993) find that high school employment is associated with lower grade point averages. Conversely, Gade & Peterson (1980), Lillydahl (1990), Meyer & Wise (1982), and Schill, et. al. (1985) detect either no effects or beneficial impacts at moderate work hours.[7] Interestingly,

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[6] Researchers have also studied the effects of youth unemployment on future outcomes (e.g. see Ellwood, 1982 or Smith, 1985).

[7] A similar lack of consensus is found in research on employment by college students. For instance, Paul (1982) uncovers negative effects of working during college, Hood, et. al. (1992) find the highest GPAs among students working 7-14 hours/week, and Ehrenberg & Sherman (1987) contrast positive effects of on-campus job holding with negative impacts of off-campus

D'Amico (1984) finds that, despite reducing the amount of time spent on studying and school activities, student employment correlates with higher class rank for white males (with no effect for females or minorities) and with higher rates of school completion and college attendance. This suggests that working students may allocate their time more efficiently than their counterparts.

The results pertaining to employment outcomes are more clearcut. Work during high school is unambiguously associated with elevated rates of future job-holding and increased earnings (D'Amico, 1984; Marsh, 1991; Meyer & Wise, 1982; Mortimer & Finch, 1986; Stephenson, 1981; Stern & Nakata, 1989; and Stevenson, 1978). It is not obvious, however, whether these represent permanent benefits or transitory gains which will disappear over time. Indeed, some researchers have argued that work by youths improves initial outcomes but reduces human capital investments and so has a negative long-term impact. Unfortunately, virtually all previous studies have focused on the period immediately following school completion, making it difficult to infer lifecycle effects.[8]

Correlations between student employment and future outcomes could result from unobserved confounding factors, rather than being due to any causal effects of the work itself. For example, Weiss (1988) has argued that the large earnings premium associated with high school graduation occurs because graduates possess large amounts of unobservable traits he groups under the rubric of "stick-to-itiveness". Using the same analogy, if students with low amounts of "stick-to-itiveness" are relatively likely to work (presumably because they do not like school), than youth employment may be associated with unfavorable future outcomes, even in the absence of a causal effect.[9] Spurious correlation is likely to be particularly problematic

positions.

[8] Exceptions include Mortimer & Finch (1986) and Stevenson (1978). However, data for these studies is from the 1960s and early 1970s and so provides limited information on recent cohorts of high school students.

when, as in many studies, only rudimentary controls for observable differences are included. Even a more comprehensive set of covariates is unlikely to eliminate the selection bias, unless it includes good proxies of the underlying attributes which determine the employment decision.

These methodological problems are further aggravated when (nonrepresentative) convenience samples are used or when subsamples are selected in ways which introduce unobserved differences between workers and nonworkers. To illustrate, consider Steinberg et. al.'s (1982) influential longitudinal study of students at four high schools in Orange County California. Their initial sample included 3101 youths who were present on two testing days at each school. From this group, they selected persons holding their first job and a random sample of those who had never worked (n=1000). 667 of the 1000 completed questionnaires in March of 1979. For the longitudinal analysis, they deleted all respondents who were working at the original survey date or who had ever been employed, reducing the sample size to 319. They were able to reinterview 228 of these individuals one year later, 52 of whom were excluded because they had worked during the intervening period but were no longer doing so. Thus, the subsample analyzed included 176 persons or 5.7% of the original (nonrepresentative) sample. More damaging than the small sample size is the likelihood that biases (some of known and some of unknown directions) were introduced at each stage in the sampling process, making it difficult to know how any findings should be interpreted.[10]

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[9] Steinberg & Dornbusch (1991) and Steinberg, et. al. (1993) provide evidence showing that, compared to nonworkers, employed high school students had lower grades and educational expectations, spent less time studying, and were less engaged in school *even before they started working*. Some researchers (e.g. Lillydahl, 1990, Meyer & Wise, 1982) have used multi-equation models or analysis of the time structure of residuals in an effort to separate causation from correlation. These attempts have met with limited success.

[10] For example, the restriction to students present at school during two testing days biases the sample against individuals with high rates of absenteeism and the deletion of persons having held but left jobs eliminates students with histories of unstable employment.

### 3. Trends in Student Employment

Much concern over student employment stems from the belief that this type of job-holding has risen rapidly in recent years, in contrast to stable or falling rates earlier in the century. For example, Greenberger & Steinberg (1986, p. 15) cite a 65% increase in the labor force participation rates of 16 and 17 year old school-going males (from 27% to 44%) occurring between 1947 and 1980. The expansion in student employment is likely to be overstated by these figures, however, for at least two reasons. First, youth unemployment increased dramatically during this period, which implies larger increases in labor force participation than employment probabilities.[11] Second, the calculated changes are quite sensitive to the endpoints chosen. For instance, the increase in participation rates was less than half as large (rising from 37% to 44%) between 1950 and 1980 as when the initial year is 1947 and there was almost no change in participation between 1950 and 1970.[12]

Unpublished *Current Population Survey* data on the employment-to-population (EP) ratios of 16 to 18 year olds who were attending school are displayed in table 2. Prior to 1989, individuals were classified according to the major activity (i.e. "school" vs. "other") they were engaged in. In 1989, the Bureau of Labor Statistics began separately reporting EP ratios by school enrollment status. Since students with heavy work commitments may consider

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[11] The unemployment rates of 16-19 year old males rose from 9.8% in 1948 to 18.3% in 1980 (Economic Report of the President, 1992, p. 340).

[12] There is some evidence that the Current Population Survey statistics underestimate the level of work involvement because the information on youths is typically provided by their parents, who systematically understate their children's labor force attachments (see Freeman & Medoff, 1982 for a careful analysis of this issue). As Flaim (1982) points out, however, much of the difference between self-reports and proxy-responses relates to casual jobs (e.g. babysitting or lawnmowing), which are reported as employment by the youth but not by the parent. Discrepancies between CPS and other survey data often result from differences in what is being measured. For example, much of the employment information in the High School and Beyond survey refers to the current *or most recent* job. Thus, many researchers (e.g. Marsh, 1991) report zero hours of work only for those students who have not held jobs at any point during the survey year. This overstates the fraction employed at a given point in time.

employment, rather than school, to be their major activity, they are excluded from the pre-1989 statistics. We therefore expect an increase in the reported EP ratios beginning in 1989. Economic conditions were similar in 1968, 1978, and 1988, so there is no reason to anticipate large biases in the observed time trends over these years. By contrast, EP ratios are likely to be depressed by the slack economic conditions of 1992.

The employment-to-population ratios of teenagers with school as a major activity rose moderately between 1968 and 1978 (from 28% to 30%), with large increases for females and little change for males. By contrast, no growth in job-holding is evident for the decade ending in 1988. Over this period, a slight contraction in male employment (from 31% to 29%) more than offsets the marginal increase for females. The underestimate of student employment probabilities prior to 1989 is made evident by contrasting the EP ratios of teenagers with school as a major activity in 1988, with those of enrolled youth one year later. The fraction holding jobs is 7 percentage points or almost 25% larger in 1989 than a year earlier (37% vs. 30%). Even more striking, is the large cyclical variability. By the 1992 recession year, the EP ratios of students had declined from 37% to 31%.

These data suggest that the frequency of student job-holding has changed relatively little over time, particularly since the middle 1970s, with any trend being small when compared to cyclical fluctuations induced by macroeconomic conditions. This finding is qualified by possible changes in work intensity of employed students. We return to this issue after describing the data set used in the analysis. A preliminary conclusion, however, is that concerns that the employment levels of high school students have been rapidly rising, during the last 25 years, may be exaggerated.

## 4. Data

This study uses data from the National Longitudinal Survey of Youth (NLSY), a sample of 12,686 men and women aged 14 through 21 on January 1, 1979. Respondents have been interviewed annually since 1979 and information through the 1991 interview is used below. The subsample analyzed is restricted to respondents who: 1) were high school freshman or sophomores in 1979, 2) remained enrolled in school through at least the interview date of their senior year (two years if a sophomore in 1979 and three years if a freshman), and 3) were members of the nationally representative cross-sectional sample of noninstitutionalized civilian youths.[13] These exclusions reduce the sample size to 1,149 (588 males and 561 females). 1,067 of these respondents (545 men and 522 women) were interviewed in 1991, a continuation rate of 93%.

The NLSY has several advantages for studying high school employment. First, it is the only survey which has followed a recent cohort of students for a sufficient time period to allow examination of the long-term effects of working. Second, it contains unusually rich information on background variables which may jointly influence both the decision to obtain employment during school and subsequent economic attainment. Third, it includes extensive retrospective data on job-holding in the period since the previous interview, including a separate work history file with week by week information on employment status.

Two types of information on high school employment are utilized in the below. The first are questions indicating hours worked during the week prior to the survey date of the respondent's sophomore, junior, and senior year of high school. Second, the work history file is used to construct measures of average work intensity during the junior and senior academic

[13] The NLSY also includes a supplemental sample of Hispanic, black, and economically disadvantaged white youths (n=5,295) and a sample of 17 to 21 year olds enlisted in the military on September 30, 1978 (n=1,280). See Center for Human Resources Research (1992) for further information on the NLSY.

years and the preceding summers.[14] By averaging over multiple weeks, the latter data has the advantage of smoothing transitory variations in employment. On the other hand, individuals may more reliably report work hours for the preceding week than for periods up to a year prior to the survey date. It is therefore not obvious which employment measure is preferable and results are presented for both below.

The dependent variables are outcomes averaged over the three year period 1988 through 1990, which is 6 to 9 years after the scheduled date of high school graduation. Using information for multiple years period smoothes the effects of temporary fluctuations and reduces the number of observations lost due to missing data.[15]

The primary outcome is annual earnings from "wages, salary, commissions, or tips...before deductions for taxes or anything else". This total is then decomposed into wage rates (hourly and weekly) and employment levels, where the former are measured as total earnings divided by hours or weeks employed. Three additional measures of economic attainment are also analyzed. The first is the Duncan Socioeconomic Index, which is a widely used measure of occupational status.[16] The second and third indicate whether group health insurance is provided by the current or most recent employer and if retirement benefits (hereafter referred to as pensions) are supplied by the company. The Duncan score is included

[14] Academic year hours were measured over a 26 week period during October, November, February, March, April, and May. This time frame was chosen to eliminate potentially atypical employment levels occurring during school weeks immediately surrounding the summer and holiday seasons. Information on summer employment was obtained for an 8 week period starting with the week which includes July 1 of the given year. Complete work histories were unavailable for 14 and 15 year olds, which prevented construction of employment hours for sophomores.

[15] When data was missing for a single year, the averaging was done over the remaining two years for which information was available.

[16] See Duncan (1961) for information on the Duncan index and Mutchler & Poston (1983) for a critique.

to capture potential differences in occupational attainment, which are not yet reflected in the relative incomes of persons in their middle to late twenties.

The regression analysis controls for two sets of supplemental covariates. The first are standard demographic variables indicating ethnic status (black, Hispanic, white), sex, marital status (single vs. currently married), geographic region (northeast, northcentral, south, west), residence in an SMSA and in an urban area, local unemployment rates (<3%, 3-6%, 6-9%, 9-12%, >12%), and high school class at the 1979 survey date (freshman vs. sophomore). Schooling is excluded because student employment may have a strong impact on the level of education, in which case the latter is endogenous. This will be directly tested for by examining the relationship between student work hours and the highest grade completed.

The second set of attributes includes potentially important characteristics for which data has typically been unavailable to previous researchers. These consist of dichotomous variables indicating whether the respondent and his/her parents are foreign born (three covariates), whether a foreign language was spoken at home, parent's educational attainment (high school dropout, high school graduate, college graduate), if magazines, newspapers, or library cards were in the home at age 14 (three variables), if the respondent considered school boring, unsafe, or was very dissatisfied with it, school type (public vs. private), whether he/she had smoked cigarettes or used drugs (marijuana or hashish) by the sophomore year of high school (two regressors), and religion (Catholic, Jewish, Baptist, other). Expected years of education, number of siblings, (log of) family incomes, and the score received on the Armed Forces Qualifications Test (AFQT) are also included in this extended set of covariates.

Family income is averaged over the student's sophomore through senior years of high school, the AFQT score is determined in 1981, information on the age of first cigarette and drug

use is obtained in 1984, and the time-varying regressors are evaluated contemporaneously with the outcome variables. All of the other covariates are evaluated at the 1979 interview date.

Mean values of key variables are presented in table 3. Column a) displays averages for all respondents; column b) is restricted to persons interviewed in 1991. Roughly half the sample are women, one-sixth are nonwhite, one-third are Catholic, and one-fifth are Southern Baptists. The parents of over two-thirds of the sample graduated from high school. Fewer than three percent of respondents are foreign born, compared to around twice as many of their parents; however, a foreign language was spoken in the home of more than one in ten individuals. The typical sample member has three siblings.

Three-quarters of the sample grew up in an urban area and two-thirds in a metropolitan location. A large majority were exposed to news publications and lived in households with library privileges at age 14. Over 90% of respondents attended public schools and almost one-sixth had negative attitudes towards their institution. The average individual expected to complete slightly over two years of college. More than 60% had smoked a cigarette by their sophomore year but fewer than one in twelve admitted having tried marijuana or hashish by that age. Respondents remaining in the sample through 1991 have virtually identical characteristics as the full sample, suggesting that attrition occurs fairly randomly.[17]

[17] Sample means as a function of survey week employment status in the sophomore through senior grades are presented in table A.1. The table shows that working students are more likely, than their counterparts, to be white and male and are more often smokers. They disproportionately come from advantaged backgrounds, as measured by the educational level of their parents and the presence of magazines, newspapers, and libary cards in the household. Interestingly, there are no consistent differences across the type of school attended, highest grade expected, or school attitudes. Student workers do, however, have much higher AFQT scores. Baptists work relatively infrequently and Catholics disproportionately often. Respondents who are foreign born or have parents who come from other countries have high employment probabilities in the junior and senior grades but not during the sophomore year. Conversely, respondents living in homes where a foreign language is spoken work relatively infrequently.

## 5. High School Employment and Economic Outcomes

Descriptive information on high school work hours is provided in table 4. As previously, column (a) refers to the full sample and column (b) to persons interviewed in 1991. Employment rates are marginally higher for individuals remaining in the sample throughout the period of investigation but there is again little evidence of attrition bias and the analysis in the remainder of the paper is restricted to the 1067 respondents remaining in the sample through 1991. The first panel of the table displays data on work hours in the week prior to the survey date (hereafter referred to as the reference or interview week); the second presents corresponding information for academic year and summer employment.

Work experience rises steadily throughout the high school years. 28% of sophomores are employed in the reference week, compared to 43% of juniors and 51% of high school seniors (see the top panel of table 4). Given the large fraction of nonemployed students, average work hours are modest, rising from slightly over 3 hours per week for sophomores to around 10 hours per week for seniors. Conditional upon employment, sophomores, juniors, and seniors work an average of 12, 16, and 19 hours per week respectively. Only 3% of sophomores, 10% of juniors, and 19% of seniors work more than 20 hours in the interview week and just 1%, 3%, and 5% are employed over 30 hours. Thus, only a small fraction of students have the heavy job commitments which have raised particular concern in previous research.

Work hours, measured over the 26 week academic year period (shown in the lower panel of the table), exceed those for the reference week by 1 hour for juniors (8.0 vs. 6.7 hours) and almost 3 hours for seniors (12.3 hours vs. 9.6 hours). Since there is no reason to expect hours in any given week to differ systematically from those averaged over a longer time period, the disparity is probably due to misreporting of the latter. Specifically, in the retrospective data,

respondents appear to overstate work hours in weeks when they are employed.[18] Conversely, the percentage of weeks worked during the academic year corresponds closely to the employment probabilities for the interview week (42.6% vs. 43.3% for juniors and 52.3% vs. 50.8% for seniors).

The work history data further indicates that employment experience is the norm for high school students, with almost two-thirds of juniors and three-quarters of seniors holding jobs at some point during the academic year. Employment hours are higher in the summer than during the academic year but the differences are relatively small, suggesting that a large number of students continue their academic year employment through the summer and vice versa.

Whites and males work more than nonwhites and females (see table 5). The gender differential in survey date work hours is 57% for sophomores (4.1 vs. 2.6), 43% for juniors (7.9 vs. 5.5), and 12% for seniors (10.1 vs. 9.0).[19] White sophomores work 40% more hours their minority peers (3.5 vs. 2.5), with still larger 74% and 54% differentials for juniors (7.3 vs. 4.2) and seniors (10.2 vs. 6.6). Conditional upon holding jobs, however, there no evidence that whites have heavier employment commitments than nonwhites. If anything, the reverse is true.[20] This suggests that the race disparities may result from differences in opportunities rather than tastes and, if student work is beneficial, could provide one reason why nonwhites receive relatively low earnings later in life.

High school students who work generally have higher levels of future economic attainment than those who do not. This correlation holds across a variety of outcome

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[18] This is consistent with other research finding that employment hours are inflated in retrospective data. For instance, estimates from the Panel Study of Income Dynamics validation study, reported by Duncan & Hill (1985), show that respondents claim to have worked 10% to 12% more hours during the previous year than were indicated by company records.

[19] Similar gender differences in student employment have been uncovered by D'Amico (1984); Gade & Peterson (1980); Michael & Tuma (1984); and Steinberg & Dornbusch (1991).

[20] Steele (1991) also finds that whites more often work than nonwhites but with no differences in hours conditional on employment.

measures, typically increases with grade level, is more pronounced for academic year than reference week employment, and is strongest when considering earnings (see table 6). For example, whereas sophomores working more than 20 hours in the interview week earn 9% more than their nonworking counterparts (6 to 9 years later), the differentials associated with junior and senior employment are a much larger 31% and 35% respectively. Individuals not working at any point during the academic year do even worse -- their counterparts averaging 20 hours of employment weekly in the junior and senior grades earn 39% and 55% more per year. These findings provide a first indication that high school employment has favorable effects on future outcomes.

## 6. Econometric Estimates

The positive relationship between student employment and subsequent labor market attainment could result from spurious correlation between youth work experience and confounding factors which actually cause the favorable performance. For example, persons with advantaged backgrounds may have superior access to jobs both in school and after graduation. If so, socioeconomic differences, rather than high school employment, may explain the disparity in economic achievement. Regression analysis is used to examine this possibility.

The basic equation estimated is:

(1) $$Y_i = X_i\beta + \gamma H_i + \delta H_i^2 + \varepsilon_i ,$$

where $Y_i$ is the outcome for individual i, X is a set of covariates, H a vector of high school work hours, and $\varepsilon$ is the regression disturbance. Quadratic terms are included to allow for nonlinear effects of student employment and the predicted effect of working H hours in a given high school grade (compared to nonworkers) is $\hat{\gamma}H + \hat{\delta}H^2$, for $\hat{\gamma}$ and $\hat{\delta}$ the regression coefficients obtained from estimating (1). Probability values (p-values) for the hypothesis that $\hat{\gamma}$ and $\hat{\delta}$ are jointly equal to zero are also reported in the tables. These are obtained from F or likelihood

ratio tests, depending upon whether the equations are estimated by OLS or using maximum likelihood techniques.

### 6.1 Earnings, Wages, and Work Hours

Table 7 presents coefficients on work hours and hours squared for a log earnings equation estimated by OLS. Column (a) displays the results of regressions which *separately* control for employment hours in a single high school year (i.e. the first panel reports coefficients from three regressions) but which include no other covariates. Column (b) combines work hours in the three high school grades into a single equation but again excludes other regressors. Column (c) adds covariates for the respondent's race, sex, marital status, geographic region, urbanicity, residence in an SMSA, and high school grade in 1979. The full set of attributes (described in section 4) are included in columns (d) and (e), with the difference between the two being that only (e) contains the AFQT score.[21] Thus, additional individual and background characteristics are held constant when moving from the left of the table to the right. To the extent that the association between high school employment and future incomes is due to confounding factors, we therefore expect the hours coefficients to decline (in absolute value) as covariates are added.

Work hours during the senior year of high school are positively and strongly correlated with future incomes, even when holding constant an unusually large variety of observables. Indeed, once the basic set of regressors included in column (c) is controlled for, additional explanatory variables have little impact on the estimated effect. For example, persons working 10 hours during the reference week of their senior year in high school are predicted to have 16% higher future earnings than their nonworking counterparts using specification (c) and 14%

[21] The AFQT score is included separately since it may be endogenous. (It is measured in 1981 and therefore could be affected by sophomore and junior year employment.) Survey date employment hours in the sophomore year are also included in the bottom panel, since a corresponding academic year measure is not available from the work history file.

greater incomes using model (e). Both results are highly significant and large earnings differentials are also observed when controlling for academic year employment during the senior year, using data from the work history file.

Conversely, there is no evidence of statistically significant employment effects for sophomores and juniors, once senior work hours are held constant. The coefficients on junior year employment are positive and significant when nothing else is controlled for (column a) but become statistically insignificant when regressors for senior employment are added (column b).[22] The inclusion of individual and background characteristics further reduces the predicted sophomore and junior year effects and they never approach statistical significance (columns c through e).[23] The remainder of the paper presents results using controls for the extended set of characteristics included in column (e).

The estimates in columns (d) and (e) include a much broader set of covariates than have been available to most previous researchers. This reduces but does not completely eliminate the possibility that the observed student employment effect is the result of uncontrolled for individual differences. For example, exceptionally motivated individuals might more often work in school and also receive relatively high incomes later in their careers. To the extent that the explanatory variables fail to account for heterogeneity in motivation, the effect of the latter may partially be captured by student work hours.

There are at least three reasons to doubt that the remaining bias is important. First, the estimated impact of senior year employment falls only slightly when moving from a relatively

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[22] This is due to a moderately high correlation of work hours across grades. The correlation between sophomore and junior work hours is 0.319, between junior and senior hours it is 0.447, and between sophomore and senior employment it is 0.236.

[23] Coefficients on the other covariates, which are displayed in table A.2, generally conform to our expectations. In particular, subsequent earnings are relatively high for whites, men, persons in areas with low local unemployment rates, and those with high educational expectations and family incomes.

parsimonious specification (column c) to one which controls for a broad array of potentially important covariates (column e). Second, if high school employment is disproportionately obtained by persons with favorable unobserved characteristics, student job-holding should be associated with high levels of academic achievement, rather than the opposite result observed by some researchers. Third, there is no reason why the effects of confounding should be limited to job-holding in the senior year. For instance, if differences in unobserved motivation are of key importance, stronger effects might be expected for sophomore or junior (than senior) year employment, since job-holding is less common in these grades and therefore presumably occurs among a more selected group.

### 6.2 Alternative Specifications

To further reduce the possibility that the senior year employment effect is spurious, the robustness of the earnings differential to changes in specifications and samples was tested for, with results reported in table 8. For comparison purposes, column (a) repeats the findings from specification (e) of table 7. Column (b) follows with estimates from a "treatment-effects" model where the "treatment" is the choice of whether or not to work in the senior year. For this model, a probit equation was first estimated, with the dependent variable equal to 1 (0) for respondents working positive hours (not working) in their senior year of high school. The inverse Mills ratio from the probit was then added as an additional covariate in the second-stage earnings equation.[24] The Mills coefficient indicates the selection effect into senior year employment, with

[24] The inverse Mills ratio is $\phi/\Phi$ and $-\phi/(1-\Phi)$, respectively, for respondents who do and do not work in their senior years, where $\phi$ and $\Phi$ are the standard normal density and distribution functions, evaluated at the inner-product of probit coefficients and individual attributes. It is typically difficult to identify this type of model because it is hard to select covariates which can justifiably be included in the probit equation but excluded from the second-stage earnings regression. In this case, however, it is reasonable to assume that geographic characteristics (local unemployment rates, region of the country, SMSA and urbanicity) during the senior year affect student employment (and so are included in the probit) but have no impact on future outcomes (and so are excluded from the earnings equation) while the reverse is true for geographic conditions averaged over the 1988-90 period.

significantly positive (negative) coefficients implying that the employment estimates from reduced form models (which do not control for the endogenous selection) are upwards (downwards) biased.[25]

Columns (c) and (d) exploit additional information available in the work history file. In (c), controls for work hours during the summer between the junior and senior year of high school are added. This allows comparison of the relative returns to academic year and summer employment. Column (d) holds constant the number of *weeks* the student is employed during the academic year, instead of the number of *hours* worked per week. Finally, columns (e) and (f) return to the original specification but provide estimates for subsamples stratified by sex.

The finding that senior work hours are positively correlated with future earnings, but with no statistically discernible impact for sophomore and junior employment, is robust across specifications and samples. The treatment-effects estimates of column (b) fail to indicate any significant selection bias in the reduced form earnings equation. Although the estimated effect of senior job-holding is slightly lowered when considering academic year work hours (and barely misses statistical significance at the 10% level), the correlation between reference week hours and future earnings is stronger in the two-stage model than in the reduced form estimates.

Interestingly, column (c) suggests that academic year employment has a bigger payoff than jobs held during the summer. This is somewhat surprising since summer work is less likely to divert time away from educational pursuits. It is possible, however, that the two types of employment are qualitatively different. Moreover, school year jobs may require students to develop time management skills whereas summer job holding does not.[26] Column (d) indicates

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[25] See Greene (1993, pp. 713-4) for further discussion of the treatment-effects model.

[26] Fairly high multicollinearity between summer and academic year employment makes it difficult to separately identify the two effects, raising the standard errors of the estimates. The correlation between work hours in the junior (senior) year and during the following (preceding) summer is 0.452 (0.419).

that the payoff to senior year employment experience holds when considering the number of weeks worked per year, rather than hours per week, and suggests the need for future research distinguishing between these two effects.

Finally, columns (e) and (f) suggest that the returns to job-holding by high school seniors are larger for females than males, although small sample sizes imply that these differences should be interpreted cautiously. One explanation is that since women have lower labor force participation rates than men, high school girls may only obtain work if they anticipate strong future workforce attachments, whereas a more random group of boys obtain positions. Even for males, however, the returns to senior year employment are substantial and highly significant when measured by interview week work hours. The issue of selection bias is considered further in section 6.4.

Table 9 presents econometric estimates for log wages and employment levels. Since hours worked annually are left-censored at 0 and weeks employed are left and right-censored at 0 and 52, OLS is inappropriate for these dependent variables and tobit models are estimated.[27] Students holding jobs during their senior year of high school both earn higher wages and work more in the future than do their nonemployed counterparts. For example, 10 hours per week of employment by seniors is associated with more than a 100 hour per year increase in work, during the 1988-90 period, and a 5% differential in hourly wages. The difference in future work hours is highly significant, whereas the wage effect is not significant at the .05 level and is only significant at the .10 level when measured by reference week employment. There is again never any statistically significant impact of employment by sophomores and juniors.

[27] The table shows tobit coefficients. The effects of marginal changes in work hours can be estimated by multiplying the relevant coefficients by $\Phi(.)$, the predicted percentage of noncensored observations.

### 6.3 Occupational Status, Fringe Benefits, and Educational Attainment

Respondents lacking high school work experience may receive relatively low pay because they have made substantial investments in education, which have not yet begun to pay off by their middle to late twenties. Alternatively, nonworking students could subsequently choose jobs with relatively low pay but which provide compensating differentials in the form of fringe benefits. To explore these possibilities, we next consider the relationship between student employment hours and four other outcomes. The Duncan score, a commonly used index of occupational prestige, is the dependent variable in column (a) of table 10. Columns (b) and (c) indicate whether the employer provides two important fringe benefits: health insurance and pension coverage. These dependent variables are trichotomous, indicating whether the fringe benefit is provided in none, some, or all of the 3 years and so ordered probit models are estimated. Finally, column (d) examines whether there are differences in educational attainment, measured as the highest grade completed by the 1991 survey date.

Results for the Duncan index and the two fringe benefits are entirely analogous to those for future incomes. Employment in the sophomore and junior year of high school is unrelated to labor market outcomes, whereas a positive and strongly significant association is observed for work hours in the senior year. Interestingly, the last effect is occurs despite a small negative impact of senior grade employment on education levels (e.g. 10 hours per week of employment is associated with a .05 to .07 year reduction in educational attainment). Thus, it appears that working seniors sacrifice a small amount of formal education in exchange for substantially larger job-related investments in human capital. These findings are consistent with previous research indicating that youth employment has ambiguous impacts on educational achievement but consistently positive effects on job-related outcomes.

### 6.4 Deletion of Part-Year Workers

The possibility that an unobserved choice process causes the positive correlation between senior year employment and future economic attainment can still not be entirely dismissed. For example, work-oriented individuals might decide both to hold jobs while in high school and to be employed relatively long hours later in life. They might also receive higher rates-of-pay if wage offers and work hours are tied. Alternatively, some persons might have better than average employment opportunities both during high school and as working adults. As discussed above, a problem with these explanations is that a positive relationship between future outcomes and student employment in all three high school grades would then be expected, rather than just for the senior year.

One way of reducing the effect of potential selection mechanisms is to limit the analysis to persons with more homogeneous future employment experiences. Towards this end, table 11 displays results for the subsample of individuals averaging more than 26 weeks of employment annually during the 1988-90 period. Although the returns to senior year employment are somewhat smaller for this group than for the full sample, statistically significant positive effects continue to be observed for incomes, Duncan scores, and the receipt of fringe benefits. For example, 10 hours of work in the survey week of the senior year is predicted to elevate annual earnings by 14% and the Duncan Index by 2.8 points, for the full sample, versus a 10% and 2.7 point increase among the subgroup. The wage effect continues to be positive, but statistically insignificant, with the predicted differential declining slightly from 8% to 6%.

Student work experience is likely to improve subsequent economic attainment partly by increasing future employment levels. Deleting persons with sporadic work experience eliminates a large portion of this effect and so the results in table 11 understate the favorable

effects of job-holding by youths. The finding of positive impacts, even for this subsample, therefore furnishes powerful evidence that senior year employment provides genuine benefits.

### 6.5 Predicted Effects of Senior Year Employment

The expected changes in economic attainment associated with senior year employment are presented in table 12. Predictions are obtained for the full sample and for equations which control for the full set of covariates (i.e. specification (e) of table 7). The top panel summarizes results for job-holding in the reference week prior; the bottom panel provides corresponding estimates for work hours averaged over the academic year. The first three columns show results for the log earnings, log wages, and the Duncan score. The last two columns refer to predicted probabilities employer-provided health insurance and pension coverage at all three of the 1988 through 1990 survey dates. The fourth row of each panel shows the number of hours of senior year employment at which the outcome is predicted to reach a maximum.

Compared to seniors who do not hold jobs, working 10 hours during the interview week is associated with 14% greater future earnings, an 8% rise in hourly wages, a 2.8 point higher Duncan Score, and 8 and 9 percentage point increases in the probability of obtaining group health insurance and pension coverage. Corresponding benefits for averaging 10 hours of employment per week throughout the academic year are 11%, 5%, 2.2 points, 7 and 6 percentage points respectively. Substantially larger gains are obtained by those working 20 hours per week. For instance, 20 hours of employment in the week before the survey is associated with 22% higher earnings, 11% greater hourly wages, a 4.1 point rise in the Duncan score, and increases exceeding 11 percentage points in the probability of receiving each of the two fringe benefits.

The predicted benefits of reference week employment are maximized at between 19 and 27 hours per week, depending upon the outcome considered. By contrast, the gains

associated with academic year job-holding peak beyond 27 hours per week and, except for pensions, increase steadily throughout the employment levels experienced by the vast majority of high school seniors. A possible reason for the difference is that since employment appears to be overestimated in the retrospective information (see section 5), the number of hours at which maximum benefits are received is likely to be overstated when using the Work History file.

### 6.6 Noncollege Educated Respondents

A question raised by the previous findings is why student employment is beneficial during the senior year of high school while having little or no corresponding positive impact in the sophomore and junior grades. One plausible hypothesis is that student job-holding offers advantages which, although substantial, depreciate rapidly over time if they are not quickly utilized. Most directly, some working seniors may be able to continue with the same company after leaving high school. Alternatively, potential employers may believe that job-holding during the senior year signals a strong work ethic or provides skills which the firm can use. Thus, noncollege-bound employed seniors may have an easier school-to-work transition than their counterparts who do not hold jobs. This could translate into long-term benefits if initial (post-school) employment experiences lead to more favorable future opportunities. Conversely, the benefits of high school employment are likely to be smaller for individuals attending college, since the senior year employment will have occurred several years before the end of schooling.

As an informal test of this hypothesis, the returns to student employment for respondents with less than 13 years of education were compared to those for the full sample and for individuals with more than 12 years of schooling. The subsample with no college is expected to contain a relatively large proportion of individuals making immediate transitions into the workforce after finishing high school, the group for whom senior year employment is

hypothesized to confer the largest benefits. Econometric estimates for the subsample, summarized in table A.3, again show a positive relationship between job-holding in the senior year and future labor market outcomes. The effect of working in earlier grades continues to differ insignificantly from zero in most cases and the parameter estimates are sensitive to the method of measuring student work hours.

Table 13 displays predicted senior year employment differentials for the subsample of noncollege educated respondents. Contrasting these estimates to the corresponding predictions in table 12 reveals that working in the senior grade is more strongly related to future earnings, hourly wages, and occupational attainment for persons with 12 or fewer years of schooling than for the full sample. For example, the premium associated with working 20 hours in the interview week is 35% for annual earnings and 18% for hourly wages among individuals with less than 13 years of education, versus 22% and 11% for the all respondents. Similarly, the gap in Duncan scores is 6.3 points for the former group as compared to 4.0 points among the latter.

There is also less evidence of diminishing returns to senior year employment for the noncollege educated. Among respondents without a college education, maximum benefits are obtained at 29, 58, and 34 hours of work in the reference week for earnings, hourly wages, and Duncan scores, respectively, versus 25, 22, and 24 hours for the full sample. These results support the notion that persons working long hours in their senior year are frequently able to continue with the same company after finishing school or to use the skills gained in related positions.

Generally consistent, although less conclusive, findings are also obtained for fringe benefits. In particular, heavy work commitments (i.e. 40 hours/week) in the senior grade correlate with larger increases in probabilities of receiving future health insurance and pension

coverage for respondents with 12 or fewer years of education than for the entire sample. Among seniors working fewer hours, relative rates of fringe benefit attainment are sensitive to whether student employment is measured in the week prior to the survey or averaged over the academic year.

Table 14 presents corresponding information for respondents with more than 12 years of schooling. As anticipated, the returns to working in the senior grade are lower than for their counterparts never attending college. For instance, 10 hours of employment in the interview week is associated with a 9% increase in annual earnings, a 4% rise in hourly wages, and a 2 point elevation in the Duncan index. None of these effects are statistically significant. Among persons whose education stops with high school, the respective increases are 21%, 11%, and 4 points. Results for fringe benefits are more ambiguous, with more (less) beneficial effects for low (high) employment hours for sample members attending college than for those who have not. It is also noteworthy that the benefits of senior year employment are maximized at relatively few hours for college-educated respondents (e.g. 19 hours in the reference week for earnings and 13 hours for wages).

## 7. Conclusion

This study uses data from the National Longitudinal Survey Youth Cohort to examine the effects of high school employment on future labor market outcomes. Contrary to some previous research, the analysis fails to uncover any evidence of harmful effects of working during high school. Instead, jobs held during the senior year yield substantial and lasting benefits. For example, seniors employed 20 hours per week are expected to earn approximately 20% more annually and to receive 10% higher hourly wages, 6 to 9 years later, than their counterparts who do not work at all. They are also more likely to receive employer-provided fringe benefits and hold higher status occupations.

The favorable effects of employment in the senior year persist after controlling for a comprehensive set of background characteristics and the results are robust across a variety of specifications, samples, and estimation techniques. For instance, gains continue to be observed after implementing a method of accounting for selection bias and when limiting the analysis to persons with strong (future) employment attachments. There is also some evidence of larger advantages for females than males and for academic year versus summer employment. The favorable impact of working in the senior grade is larger for persons without college educations than for those completing one or more years of college. This suggests that the benefits of student employment depreciate rapidly over time, unless they immediately precede the school-to-work transition, and may explain why the returns to job-holding in the senior year of high school exceed those of working in the sophomore or junior grades.

Several caveats are worth noting. First, it is possible that controls for a still broader set of covariates would reduce the advantages associated with job-holding by high school seniors. Second, this study has focused exclusively on measurable economic outcomes. Third, the analysis is restricted to individuals remaining in school through the normal age of high school graduation. Finally, although this investigation covers a longer time period than previous research, there may be deleterious impacts of student job-holding which do not show up until later in life.

While these qualifications imply that the conclusions of this study should be interpreted cautiously, it is doubtful that any of them account for the key finding that benefits are associated with senior year employment. The characteristics controlled for in this analysis are unusually comprehensive and there is little evidence that the addition of covariates, beyond the basic set available to previous researchers, substantially changes the results. The findings are unlikely to be explained by spurious correlation between senior grade job-holding and important

excluded characteristics, since most such factors would also be associated with employment in the sophomore and junior years. For example, if unaccounted for differences in socioeconomic status increase both the probability of working in high school and the level of future economic attainment, student employment in all three grades would be positively correlated with subsequent labor market status. Instead, strong benefits are observed only for working seniors.

Deleterious effects of student employment on the social development of adolescents are likely to be at least partially manifested in future labor market outcomes. The positive economic impacts of working uncovered above therefore suggest that these problems either do not occur, are transitory in nature, or are more than compensated for by beneficial investments in human capital. Although the analysis does point to a negative relationship between senior year employment and educational attainment, the predicted effect is extremely small -- working 20 hours per week is associated with a reduction in schooling of less than two months. There could be a larger impact on high school completion rates but this possibility is belied by the lack of evidence that work in the sophomore or junior years has an impact on the highest grade completed (among those remaining in school through their senior year) or on any of the other outcome variables.

The likelihood that negative effects of high school work experience do not show up until later ages than those studied is reduced by the strong positive correlation between senior year employment and the Duncan occupational index. Working 20 hours per week in the senior year of high school is associated with a 4 point increase in the Duncan Score.[28] To the extent that occupational attachments are established by the middle to late twenties, the Duncan index should reveal differences in status which will be reflected in earnings at later ages.

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[28] For comparison purposes, the Duncan score of a welder is 6 points higher than that of an assembler.

Much of the alarm that the jobs held by high school students may hinder their long-term development has been based on the analysis of nonrepresentative samples and using methods which are unlikely to account for the selection process into student employment. The concerns have also been magnified by a belief that job-holding among in-school youths has rapidly increased since the end of World War II. This trend appears to have ended by the late 1970s, with subsequent reductions in the employment-to-population ratios of some groups (e.g. 16-18 year old boys). Moreover, the NLSY data indicates that relatively few students work the long hours that have caused particular consternation.

Further research on the benefits and costs of student employment is needed. In particular, It is important to better understand the mechanisms by which the early work experience raises economic attainment, analyze the importance of characteristics of the jobs held by high school students, and examine the types and sources of demographic group differences in returns to student employment. Based upon the current state of knowledge, however, concern that working during high school has extremely deleterious consequences appears to be misplaced. A tentative but fairly strong conclusion is that light to moderate work commitments provide important net human capital investments and so should be encouraged, especially as students approach the end of their high school years.

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**Table 1: Results of Previous Studies Examining the Effects of High School Employment**

| Author | Sample | "Effects" of Employment and Increased Work Hours | Comments |
|---|---|---|---|
| Barone (1993) | 2000 students in 4 high schools in upstate New York | Slightly lower GPAs, beyond a low work threshold. | Potentially nonrepresentative sample, no covariates. |
| D'Amico (1984); D'Amico & Baker (1984) | National Longitudinal Survey Youth Cohort (NLSY), 1979-82 interviews; high school students (in 1979). | Reduced study time and time spent in school activities. Positive effects on class rank for white males, no impact for other groups. Increased knowledge of work world for females. Increased (decreased) probability of dropping out and lower (higher) rates of college attendance above (below) 20 hours/week of work. Lower unemployment rates, higher wages, and higher SEI in first year out of high school (for noncollege bound). | Somewhat selected sample (e.g. class rank only available for respondents graduating high school by January 1991). |
| Gade & Peterson (1980) | 351 tenth grade students in two urban high schools in upper midwest. | Statistically insignificantly higher grades. | Small, possibly unrepresentative samples. |
| Greenberger & Steinberg (1980); Greenberger, et. al. (1982) | 531 tenth and eleventh graders from 4 Southern California high schools. Sample includes 212 students currently holding first jobs and 319 who had never worked. | Greater absenteeism from school, lower GPAs, less time studying, lower educational expectations, more frequent delinquency, greater "business knowledge". | Unrepresentative sample, selection procedure introduces biases. |
| Lillydahl (1990) | 1987 National Assessment of Economic Education Survey. Sample includes juniors and seniors not attending vocational schools. | Intermediate work levels (1-10 hours/week) associated with highest levels of academic achievement. | Simultaneous equation model is poorly described; specifications vary across outcome measures. |
| Marsh (1991) | High School and Beyond Survey (HSB), 1980-84 interviews. | Reduction in a wide variety of education outcome measures. Decrease in probability of unemployment two years after normal high school graduation date. | Attrition reduces sample size and could induce bias. Effects of hours are assumed to be linear |
| Meyer & Wise (1982) | National Longitudinal Survey of the High School Class of 1972 (NLS72), 1972-76 interviews, males only. | Increases in academic performance, weeks worked, and wage rates. | Relatively good controls for background characteristics. |
| Mortimer & Finch (1986) | Youth in Transition Study, 1966-74 interviews, tenth graders (in 1966). | Lower grades, academic self-esteem, educational, and occupational aspirations. Higher 1973 earnings and occupational attainment levels. Stronger effects at high work hours. | Data available for 5 years after normal high school graduation date. Effects of dropping out of high school not adequately accounted for. |

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Table 1: (continued)

| Author | Sample | "Effects" of Employment and Increased Work Hours | Comments |
|---|---|---|---|
| Schill, et. al. (1985) | 14-19 year old students in Washington State taking classes required for high school graduation. | Higher GPAs, particularly at 1-20 hours of work. | No covariates controlled for. Positive effect of SEC on work and GPA suggest confounding factors. |
| Steel (1991) | NLSY, 1979-81 interviews, 17-18 year olds (in 1979). | Future school enrollment rates raised (lowered) by small to medium (high) work hours for whites. More negative effects for blacks. Subsequent weeks worked increased for whites; no effect for blacks, hispanics. | Inclusion of out-of-school youths in sample biases analysis of future enrollment rates. Imprecise estimates for nonwhites. |
| Stephenson (1981) | National Longitudinal Survey (NLS) of Young Men, 1966-71 interviews. | Raises future wages, especially for full-time employment during high school. | Wages of nonworkers set to zero, rather than to potential earnings levels. Future wages could reflect continuation of high school jobs. |
| Stern & Nakata (1989) | NLSY, 1979-82 interviews, high school seniors who graduated high school but did not directly enroll in college. | Higher hourly earnings and less unemployment after high school graduation, particularly when student employment required complex dealings with people, things, or data. | Relatively few covariates controlled for. |
| Stevenson (1978) | NLS young men and young women. 16-19 year olds in initial survey year and followed for 7 years. | High employment rates and earnings in later years. | Few covariates controlled for and some (e.g. labor market knowledge) may be endogenous. |
| Steinberg & Dornbusch (1991); Steinberg, et. al. (1993) | 10th-12th graders from 6 high schools in Northern California and 3 in Wisconsin, interviewed in fall 1987 and spring 1988 (and 1 year later in Steinberg, et. al.) | No effect for 1-10 hours of work. Negative effects on a wide variety of school performance, psychological, and psychosocial maturity variables for longer work hours. | Few covariates controlled for. Some outcome variables assessed 5 months after employment status was measured. Potentially severe selection bias in longitudinal analysis. |
| Steinberg & Greenberger (1982) | Sophomores and juniors in 1979 from four Southern California high schools reinterviewed in 1980. | Greater work orientation; less school involvement but no difference in absenteeism or GPAs; more materialistic attitudes; greater use of cigarettes and marijuana. | Unrepresentative sample and selection process introduces extremely severe biases of unknown direction. |
| Tymms & Fitz-Gibbon (1992) | 1989 A-level Information Systems Data Set. Sample includes U.K. students studying for the A-level exams. | Small negative effect on A-level grades, particularly above 9 hours/week. No impact on study time. | Few covariates controlled for. |

**Table 2:**
**Employment-to-Population Ratios of 16-18 Year Old Students in Selected Years**

| Age in Years | 1968 | 1978 | 1988 | 1989 | 1992 |
|---|---|---|---|---|---|
| | (School is Major Activity) | | | (Enrolled in School) | |
| **Males and Females** | | | | | |
| 16 | 23.5 % | 25.5 % | 23.6 % | 28.8 % | 22.4 % |
| 17 | 30.7 | 35.2 | 33.9 | 40.0 | 33.7 |
| 18 | 30.0 | 31.6 | 33.3 | 44.3 | 40.2 |
| 16-18 | 27.6 | 30.4 | 29.8 | 37.2 | 31.2 |
| **Males** | | | | | |
| 16 | 27.0 % | 26.2 % | 23.4 % | 27.3 % | 22.0 % |
| 17 | 35.8 | 36.3 | 32.6 | 39.2 | 32.7 |
| 18 | 36.3 | 32.8 | 32.5 | 44.2 | 39.6 |
| 16-18 | 32.4 | 31.4 | 29.1 | 36.3 | 30.6 |
| **Females** | | | | | |
| 16 | 19.9 % | 24.9 % | 23.8 % | 30.3 % | 22.8 % |
| 17 | 25.4 | 34.0 | 35.2 | 40.9 | 34.8 |
| 18 | 22.8 | 30.3 | 34.1 | 44.3 | 40.8 |
| 16-18 | 22.5 | 29.3 | 30.6 | 38.0 | 31.9 |

Note: Table shows annual average employment-to-population ratios for 16 to 18 year olds for whom school is the major activity (1968, 1978, 1988) or who are enrolled in school (1989, 1992). Source: unpublished *Current Population Survey* data provided by the U.S. Department of Labor, Bureau of Labor Statistics.

**Table 3: Sample Means for Selected Characteristics**

| | All Respondents | Respondents Interviewed in 1991 |
|---|---|---|
| Demographic Characteristics | | |
| Female | 48.8 % | 48.9 % |
| Black | 11.8 | 11.5 |
| Hispanic (Nonblack) | 6.1 | 6.3 |
| Foreign Language Spoken in Home | 10.9 | 11.2 |
| Foreign Born | 2.6 | 2.7 |
| Number of Siblings | 3.0 | 3.0 |
| Education | | |
| Attends Public School | 92.8 | 92.8 |
| Negative Attitude Towards School | 15.5 | 15.3 |
| Highest Grade Expected | 14.3 yrs | 14.3 yrs |
| AFQT Score (1981) | 45.7 | 45.9 |
| Residence | | |
| In Urban Area | 74.1 % | 74.6 % |
| In SMSA | 66.1 | 66.4 |
| Household Resources at Age 14 | | |
| Magazines | 73.1 | 73.9 |
| Newspapers | 84.2 | 84.3 |
| Library Card | 74.0 | 74.1 |
| Drug Use | | |
| Used Cigarettes By Sophomore Year | 61.8 | 62.4 |
| Used Marijuana or Hashish By Sophomore Year | 7.8 | 7.9 |
| Religion: | | |
| Baptist | 19.0 | 18.2 |
| Catholic | 33.1 | 33.6 |
| Jewish | 1.1 | 1.0 |
| Characteristics of Mother | | |
| Foreign Born | 5.8 | 6.2 |
| High School Graduate | 69.8 | 69.7 |
| College Graduate | 11.1 | 10.8 |
| Characteristics of Father | | |
| Foreign Born | 5.7 | 5.8 |
| High School Graduate | 67.1 | 67.5 |
| College Graduate | 18.4 | 18.4 |
| N | 1,149 | 1,067 |

Note: Unless otherwise specified in the text of the paper, all variables are obtained from 1979 interview and refer to 1979. Respondent is defined to have negative attitudes towards school if they respond that they either of the statements "most of my classes are boring" or "I don't feel safe at this school" are "very true" or if they say that they are "very dissatisfied" with their school.

**Table 4: Frequency and Amount of High School Employment**

| | Sophomores | | Juniors | | Seniors | |
|---|---|---|---|---|---|---|
| | (a) | (b) | (a) | (b) | (a) | (b) |
| **Employment Status in Week Prior to Survey Date** | | | | | | |
| Percent Working | 27.9 % | 28.3 % | 42.4 % | 43.3 % | 50.3 % | 50.8 % |
| Ave. Hours/Week | 3.3 hr | 3.3 hr | 6.6 hr | 6.7 hr | 9.4 hr | 9.6 hr |
| Ave. Hours/Week if Employed | 11.9 hr | 11.8 hr | 15.5 hr | 15.5 hr | 18.7 hr | 18.9 hr |
| Hours Worked in Week Prior to Survey | | | | | | |
| 0 | 72.2 % | 71.8 % | 57.6 % | 56.6 % | 49.7 % | 49.2 % |
| 1 - 10 | 16.3 | 16.4 | 15.4 | 15.8 | 11.3 | 11.3 |
| 11 - 20 | 8.1 | 8.5 | 17.1 | 17.5 | 20.5 | 20.5 |
| 21 - 30 | 2.2 | 2.3 | 7.6 | 7.7 | 13.4 | 13.8 |
| 31 - 40 | 0.7 | 0.7 | 2.0 | 2.1 | 4.1 | 4.2 |
| > 40 | 0.5 | 0.4 | 0.4 | 0.4 | 1.0 | 1.0 |
| **Academic Year Employment (From Work History File)** | | | | | | |
| Percent Employed 1 Week | | | 63.9 % | 64.9 % | 72.6 % | 73.4 % |
| Percent of Weeks Employed | | | 41.5 % | 42.6 % | 51.5 % | 52.3 % |
| Ave. Hours/Week | | | 7.7 hr | 8.0 hr | 12.1 hr | 12.3 hr |
| Ave. Hours/Week if Employed | | | 18.6 hr | 18.9 hr | 23.5 hr | 23.5 hr |
| **Summer Employment (From Work History File)** | | | | | | |
| Percent Employed 1 Week | | | 56.2 % | 57.2 % | 59.6 % | 60.8 % |
| Percent of Weeks Employed | | | 44.1 % | 45.0 % | 48.5 % | 49.6 % |
| Ave. Hours/Week | | | 10.2 hr | 10.3 hr | 13.7 hr | 14.0 hr |
| Ave. Hours/Week if Employed | | | 23.1 hr | 23.0 hr | 28.2 hr | 28.1 hr |

Note: Full sample included in column (a), n=1149. Column (b) includes respondents interviewed in 1991, n=1067. Academic year employment status calculated for 26 week periods covering the months of October, November, February, March, April, and May of the relevant survey years. Summer employment status is calculated for 8 week periods beginning with the week which includes July 1 of the summer before the specified high school year.

**Table 5:**
**Hours of High School Employment by Race and Sex**

| Type of Employment | Full Sample | Males | Females | Whites | Nonwhites |
|---|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | | |
| Sophomore Grade Employment | | | | | |
| Ave. Hours | 3.3 hr | 4.1 hr | 2.6 hr | 3.5 hr | 2.5 hr |
| Ave. Hours if Employed | 11.8 | 12.8 | 10.5 | 11.3 | 16.3 |
| Junior Grade Employment | | | | | |
| Ave. Hours | 6.7 hr | 7.9 hr | 5.5 hr | 7.3 hr | 4.2 hr |
| Ave. Hours if Employed | 15.5 | 16.8 | 13.9 | 15.6 | 15.0 |
| Senior Grade Employment | | | | | |
| Ave. Hours | 9.6 hr | 10.1 hr | 9.0 hr | 10.2 hr | 6.6 hr |
| Ave. Hours if Employed | 18.9 | 19.7 | 17.9 | 18.8 | 19.2 |
| **Academic Year Employment Hours (From Work History File)** | | | | | |
| Junior Grade Employment | | | | | |
| Ave. Hours | 8.0 hr | 9.1 hr | 6.9 hr | 8.6 hr | 5.4 hr |
| Ave. Hours if Employed | 18.9 | 20.1 | 17.4 | 18.7 | 20.2 |
| Senior Grade Employment | | | | | |
| Ave. Hours | 12.3 hr | 13.4 hr | 11.2 hr | 13.1 hr | 8.8 hr |
| Ave. Hours if Employed | 23.6 | 25.3 | 21.8 | 23.5 | 24.3 |
| **Summer Employment Hours (From Work History File)** | | | | | |
| Junior Grade Employment | | | | | |
| Ave. Hours | 10.3 hr | 12.6 hr | 8.0 hr | 10.6 hr | 9.4 hr |
| Ave. Hours if Employed | 23.0 | 24.8 | 20.5 | 22.2 | 28.4 |
| Senior Grade Employment | | | | | |
| Ave. Hours | 14.0 hr | 16.9 hr | 10.9 hr | 14.5 hr | 11.3 hr |
| Ave. Hours if Employed | 28.1 | 30.9 | 24.6 | 27.9 | 29.5 |

Note: Sample includes respondents interviewed in 1991. Sample sizes are 1067, 545, 522, 877, and 190 for the full sample, males, females, whites, and nonwhites respectively.

**Table 6:**
**Economic Outcomes By High School Employment Hours in Week Prior to Survey**

| High School Employment Hours | N | Outcome Measure (1988-90 Average) Annual Earnings | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan |
|---|---|---|---|---|---|
| **All Respondents** | 1,067 | $16,513 | 42.4 | 75.6% | 53.6% |
| **Employment Status in Week Prior to Survey Date** | | | | | |
| **Sophomore Work Hours** | | | | | |
| 0 | 766 | $16,012 | 42.1 | 75.2% | 54.1% |
| 1-20 | 266 | $17,846 | 44.3 | 77.5% | 52.3% |
| > 20 | 35 | $17,441 | 34.0 | 71.1% | 53.9% |
| **Junior Work Hours** | | | | | |
| 0 | 604 | $15,086 | 41.5 | 74.0% | 52.9% |
| 1-20 | 355 | $17,969 | 44.1 | 77.2% | 54.5% |
| > 20 | 108 | $19,739 | 41.3 | 79.9% | 55.0% |
| **Senior Work Hours** | | | | | |
| 0 | 525 | $14,422 | 39.6 | 70.7% | 49.6% |
| 1-20 | 339 | $17,949 | 45.8 | 80.8% | 58.3% |
| > 20 | 203 | $19,510 | 43.6 | 79.7% | 56.1% |
| **Academic Year Work Hours (From Work History File)** | | | | | |
| **Junior Work Hours** | | | | | |
| 0 | 370 | $13,856 | 40.4 | 72.3% | 53.7% |
| 1-20 | 553 | $17,592 | 44.1 | 77.1% | 52.2% |
| > 20 | 139 | $19,241 | 40.7 | 77.9% | 58.9% |
| **Senior Work Hours** | | | | | |
| 0 | 282 | $12,765 | 37.7 | 69.9% | 51.7% |
| 1-20 | 494 | $16,703 | 43.4 | 75.0% | 51.7% |
| > 20 | 289 | $19,789 | 44.9 | 81.9% | 58.3% |

Note: Sample includes respondents interviewed in 1991. Table shows average values of outcome variables for 1988-90 time period. If data is missing for one interview, the average is calculated for the remaining two years.

**Table 7:**
**Regression Estimates of Log Earnings on High School Employment Hours**

| Type of Employment | Regression Specification (a) | (b) | (c) | (d) | (e) |
|---|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | | |
| Sophomore Hours | .0171 | .0055 | .0013 | .0016 | 4.8E-4 |
| Hours Squared | -4.4E-4 | -2.4E-4 | -1.5E-4 | -6.8E-5 | -3.7E-5 |
| P-Value | [.193] | [.683] | [.642] | [.966] | [.980] |
| Junior Hours | .0202 | .0100 | .0050 | .0013 | .0013 |
| Hours Squared | -3.8E-4 | -1.1E-4 | -8.5E-5 | -1.7E-5 | 1.6E-5 |
| P-Value | [.005] | [.173] | [.701] | [.878] | [.877] |
| Senior Hours | .0238 | .0210 | .0185 | .0178 | .0168 |
| Hours Squared | -4.6E-4 | -4.5E-4 | -3.7E-4 | -3.7E-4 | -3.4E-4 |
| P-Value | [.000] | [.008] | [.007] | [.014] | [.019] |
| **Academic Year Employment Hours (From Work History File)** | | | | | |
| Junior Hours | .0286 | .0155 | .0068 | .0041 | .0056 |
| Hours Squared | -8.0E-4 | -6.1E-4 | -3.8E-4 | -2.6E-4 | -2.8E-4 |
| P-Value | [.004] | [.243] | [.371] | [.601] | [.610] |
| Senior Hours | .0234 | .0176 | .0151 | .0138 | .0120 |
| Hours Squared | -3.7E-4 | -2.0E-4 | -1.9E-4 | -2.0E-4 | -1.5E-4 |
| P-Value | [.000] | [.002] | [.008] | [.036] | [.062] |

Notes:

1. Sample includes respondents interviewed in 1991. Outcome measures are three-year averages for the 1988-90 period. Table displays regression coefficients on work hours and work hours squared (n=990). P-value of the hypothesis that the coefficients on hours worked and hours worked squared are jointly equal to zero (obtained from F tests) is displayed in brackets.

2. Model (a) shows results from regressions which control for work hours in a single high school class. In model (b), hours in all high school grades are controlled for (sophomore, junior, and senior hours in the top panel, junior and senior hours in the bottom panel). Model (c) adds regressors for the high school grade in 1979, ethnic status (black, hispanic, white), sex, marital status, geographic region (4 categories), residence in an SMSA and Urban area, and the local unemployment rate (6 categories). Model (d) includes the covariates in (c) plus: whether the respondent and his/her parents are foreign born, if a foreign language was spoken in the home when the respondent was a child, mother and father's educational attainment (4 categories each), whether magazines, newspapers, or library card were in the home when the respondent was 14, number of siblings, religion (4 categories), educational attitudes (if the respondent considered his school boring, unsafe, or was very dissatisfied with the school), educational expectations, type of school at 1979 survey date (public vs. private), whether the respondent had smoked cigarettes or used marijuana or hashish by the sophomore year of high school, the log of average family incomes during the respondent's sophomore through senior years, and (in the lower panel) work hours and hours squared in the week prior to the sophomore year survey date. Model (e) includes these variables, plus the (1981) AFQT score.

**Table 8:**
**Additional Regression Estimates for Log Earnings on High School Employment**

| Type of Employment | Full Sample Estimates (a) | (b) | (c) | (d) | Males (e) | Females (f) |
|---|---|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | | | |
| Sophomore Hours | 4.8E-4 | 4.3E-4 | | | .0134 | -.0199 |
| Hours Squared | -3.7E-5 | -3.8E-5 | | | -4.5E-4 | 9.7E-4 |
| P-Value | [.980] | [.342] | | | [.167] | [.551] |
| Junior Hours | .0013 | .0013 | | | 7.8E-4 | .0064 |
| Hours Squared | 1.6E-5 | 1.8E-5 | | | 4.1E-5 | -2.1E-4 |
| P-Value | [.877] | [.304] | | | [.821] | [.936] |
| Senior Hours | .0168 | .0198 | | | .0146 | .0290 |
| Hours Squared | -3.4E-4 | -4.0E-4 | | | -2.5E-4 | -8.1E-4 |
| P-Value | [.019] | [.088] | | | [.038] | [.110] |
| Inverse Mills Ratio | | -.0242 | | | | |
| T-Statistic | | (.299) | | | | |
| **Employment Hours or Weeks (From Work History File)** | | | | | | |
| Junior Hours/Weeks | .0056 | .0059 | .0065 | .0010 | .0031 | 4.1E-4 |
| Hrs/Wks Squared | -2.8E-4 | -3.0E-4 | -3.0E-4 | -5.3E-4 | -4.7E-5 | -4.6E-4 |
| P-Value | [.610] | [.195] | [.646] | [.386] | [.886] | [.248] |
| Senior Hours/Weeks | .0120 | .0078 | .0092 | .0076 | .0076 | .0225 |
| Hrs/Wks Squared | -1.5E-4 | -7.3E-5 | -9.1E-5 | 3.5E-6 | -4.7E-5 | -4.3E-4 |
| P-Value | [.062] | [.106] | [.131] | [.059] | [.143] | [.152] |
| Summer Hours | | | .0049 | | | |
| Hours Squared | | | -1.3E-4 | | | |
| P-Value | | | [.350] | | | |
| Inverse Mills Ratio | | .0413 | | | | |
| T-Statistic | | (.717) | | | | |

Note: See notes on table 7. Table presents coefficients on linear and quadratic terms for hours (or weeks) worked. P-Values (obtained from F or likelihood ratio tests) are shown in brackets and t statistics in parentheses. Additional covariates are the same as in specification (e) of table 7 and employment coefficients from that specification are displayed in column (a). Column (b) shows results of an equation which corrects for selection bias by including the inverse Mills ratio from probit estimates of the probability of working positive hours in the senior year of high school. Column (c) includes controls for average hours worked during an eight week period beginning with the week which includes July 1 of the summer before the senior year of high school. In column (d), weeks rather than hours/week of academic year employment, are controlled for. Column (e) and (f) present estimates for the same specification as column (a), for subsamples of males (n=512) and females (n=471).

**Table 9:**
**OLS and Tobit Estimates of Wages and Employment Levels on High School Employment Hours and Covariates**

| Type of Employment | Weekly Wages | Hourly Wages | Annual Weeks Worked | Annual Hours Worked |
|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | |
| Sophomore Hours | .0031 | .0013 | .1925 | 1.172 |
| Hours Squared | -1.6E-4 | -9.4E-5 | -.0056 | -.013 |
| P-Value | [.616] | [.747] | [.627] | [.967] |
| Junior Hours | .0054 | .0039 | .0213 | .869 |
| Hours Squared | -1.2E-4 | -5.6E-5 | -.0022 | -.034 |
| P-Value | [.576] | [.535] | [.840] | [.988] |
| Senior Hours | .0096 | .0095 | .4551 | 10.006 |
| Hours Squared | -2.0E-4 | -2.2E-4 | -.0061 | -.369 |
| P-Value | [.088] | [.067] | [.000] | [.000] |
| $\Phi(\bullet)$ | | | .547 | .979 |
| **Academic Year Employment Hours (From Work History File)** | | | | |
| Junior Hours | .0054 | .0030 | -.0203 | 5.489 |
| Hours Squared | -2.6E-4 | -1.9E-4 | -3.2E-4 | -.128 |
| P-Value | [.474] | [.513] | [.946] | [.659] |
| Senior Hours | .0058 | .0053 | .3516 | 12.223 |
| Hours Squared | -4.8E-5 | -5.0E-5 | -.0034 | -.129 |
| P-Value | [.133] | [.148] | [.001] | [.001] |
| $\Phi(\bullet)$ | | | .548 | .979 |

Note: See notes on table 7. The same covariates are included as in specification (e) of that table. Estimation technique is OLS in columns (a) and (b) and Tobit in (c) and (d). Sample sizes are 979, 980, 1048, and 1050 in columns (a) through (d) respectively. 44 observations are left-censored at zero hours or weeks and 394 are right-censored at 52 weeks. $\Phi(\bullet)$ is the predicted percentage of noncensored observations (estimated as the average value of $\Phi(X\beta/\sigma)$ in the single limit TOBIT case).

**Table 10:**
**Regression and Ordered Probit Estimates of Duncan Scores, Fringe Benefits and Educational Attainment on High School Employment Hours and Covariates**

| Type of Employment | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan | Highest Grade Completed |
|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | |
| Sophomore Hours | .0875 | .0126 | -.0017 | -.0033 |
| Hours Squared | -.0058 | -5.3E-4 | -1.8E-4 | 3.9E-4 |
| P-Value | [.333] | [.303] | [.428] | [.364] |
| Junior Hours | .0263 | -.0022 | -.0077 | -.0042 |
| Hours Squared | -.0023 | 9.8E-5 | 3.1E-4 | -3.4E-5 |
| P-Value | [.804] | [.973] | [.735] | [.678] |
| Senior Hours | .3532 | .0242 | .0311 | -.0041 |
| Hours Squared | -.0075 | -4.4E-4 | -8.0E-4 | -3.2E-4 |
| P-Value | [.012] | [.009] | [.002] | [.006] |
| **Academic Year Employment Hours (From Work History File)** | | | | |
| Junior Hours | .0074 | -.0108 | -.0161 | -.0045 |
| Hours Squared | -.0045 | 1.3E-4 | 5.1E-4 | -1.8E-4 |
| P-Value | [.266] | [.399] | [.451] | [.352] |
| Senior Hours | .2426 | .0216 | .0183 | -.0040 |
| Hours Squared | -.0020 | -2.6E-4 | -3.4E-4 | -1.2E-4 |
| P-Value | [.008] | [.006] | [.098] | [.262] |

Note: See notes on table 7. The same covariates are included as in specification (e) of that table. The Duncan score and grade completion equations are estimated using OLS. Ordered probit models are estimated for employer health insurance and pension coverage. The dependent variable in these equations is equal to 0, 1, and 2 if the fringe benefit is provided at none, some, or all or the three interview dates, respectively. P-Values for these cases are obtained from likelihood ratio tests. Missing values on the dependent variables reduce the sample sizes to 1000, 961, 961, 1045, respectively, for the Duncan index, health insurance, pension coverage, and grade completion.

**Table 11:**
**Regression and Ordered Probit Estimates of Log Earnings, Duncan Scores,and Fringe Benefits for Persons Working Over 26 Weeks Per Year**

| Type of Employment | Annual Earnings | Hourly Wages | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan |
|---|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | | |
| Sophomore Hours | .0041 | .0045 | .1012 | .0098 | -.0049 |
| Hours Squared | -1.9E-4 | -1.9E-4 | -.0068 | -4.3E-4 | -9.3E-5 |
| P-Value | [.521] | [.438] | [.233] | [.462] | [.409] |
| Junior Hours | 3.5E-4 | .0039 | .0642 | -.0100 | -.0116 |
| Hours Squared | 1.0E-4 | -4.3E-5 | -.0041 | 3.8E-4 | 4.8E-4 |
| P-Value | [.390] | [.374] | [.651] | [.722] | [.507] |
| Senior Hours | .0118 | .0076 | .3498 | .0282 | .0362 |
| Hours Squared | -2.5E-4 | -1.8E-4 | -.0078 | -5.2E-4 | -9.5E-4 |
| P-Value | [.023] | [.135] | [.021] | [.004] | [.000] |
| **Academic Year Employment Hours (From Work History File)** | | | | | |
| Junior Hours | -5.7E-4 | 6.9E-4 | -.0411 | -.0119 | -.0177 |
| Hours Squared | 5.8E-5 | -2.1E-5 | -.0036 | 2.6E-4 | 6.4E-4 |
| P-Value | [.915] | [.993] | [.197] | [.622] | [.408] |
| Senior Hours | .0083 | .0041 | .2248 | .0234 | .0207 |
| Hours Squared | -8.2E-5 | -1.7E-5 | -.0016 | -3.0E-4 | -4.0E-4 |
| P-Value | [.023] | [.111] | [.014] | [.008] | [.083] |

Note: See notes on tables 7 and 10. Sample includes respondents interviewed in 1991 who average more than 26 weeks of employment per year during the 1988 through 1990 period (n=876).

**Table 12:**
**Change in Economic Attainment Associated With Senior Year Employment**

| Hours of Employment in Senior Year | Annual Earnings | Hourly Wages | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan |
|---|---|---|---|---|---|
| **Differentials Associated with Employment in Week Prior to the Survey Date** | | | | | |
| 10 Hours | 14.3% | 7.7% | 2.8 pts. | .075 | .087 |
| 20 Hours | 22.1 | 11.0 | 4.1 | .114 | .115 |
| 40 Hours | 13.4 | 3.8 | 2.1 | .097 | -.015 |
| Max. Difference | 24.6 hr | 22.2 hr | 23.5 hr | 27.3 hr | 19.4 hr |
| **Differentials Associated with Academic Year Employment (from Work History File)** | | | | | |
| 10 Hours | 11.0% | 5.0% | 2.2 pts. | .074 | .055 |
| 20 Hours | 19.3 | 9.1 | 4.0 | .125 | .086 |
| 40 Hours | 25.5 | 14.4 | 6.5 | .168 | .069 |
| Max. Difference | 37.9 hr | 53.6 hr | 59.8 hr | 42.1 hr | 26.8 hr |

Note: Sample includes respondents interviewed in 1991. Table shows difference in predicted outcomes compared to persons not working in the senior year of high school. Estimates are obtained from OLS and ordered probit estimates of equations which include the same set of covariates as in specification (e) of table 7. The fourth and fifth columns refer to the probability that the respondent receives employer health insurance or pension coverage at the time of the 1988, 1989, and 1990 surveys. Sample averages for the Duncan Index and probabilities of receiving health insurance and pension coverage from the employer are 42.4 points, .623, and .375 respectively.

**Table 13:**
**Change in Economic Attainment Associated With Senior Year Employment for Respondents Never Attending College**

| Hours of Employment in Senior Year | Annual Earnings | Hourly Wages | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan |
|---|---|---|---|---|---|
| **Differentials Associated with Employment in Week Prior to the Survey Date** | | | | | |
| 10 Hours | 21.1% | 11.0% | 3.8 pts. | .029 | .054 |
| 20 Hours | 35.4 | 18.0 | 6.3 | .057 | .075 |
| 40 Hours | 32.9 | 16.8 | 7.4 | .110 | .011 |
| Max. Difference | 28.9 hr | 57.8 hr | 34.4 hr | >100 hr | 20.8 hr |
| **Differentials Associated with Academic Year Employment (from Work History File)** | | | | | |
| 10 Hours | 10.2% | 4.9% | 4.4 pts. | .070 | .060 |
| 20 Hours | 23.5 | 11.9 | 7.3 | .124 | .096 |
| 40 Hours | 63.4 | 34.0 | 8.4 | .192 | .085 |
| Max. Difference | no maximum | no maximum | 33.8 hr | 59.8 hr | 28.2 hr |

Note: See notes on table 12. Sample includes respondents interviewed in 1991 who have less than 13 years of education (n=476).

**Table 14:**
**Change in Economic Attainment Associated With Senior Year Employment for Respondents With College Educations**

| Hours of Employment in Senior Year | Annual Earnings | Hourly Wages | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan |
|---|---|---|---|---|---|
| **Differentials Associated with Employment in Week Prior to the Survey Date** | | | | | |
| 10 Hours | 9.0% | 4.1% | 1.9 pts. | .126 | .129 |
| 20 Hours | 11.5 | 3.3 | 2.3 | .180 | .166 |
| 40 Hours | -3.1 | -12.0 | -1.7 | .118 | -.039 |
| Max. Difference | 18.7 hr | 13.4 hr | 17.3 hr | 24.6 hr | 18.9 hr |
| **Differentials Associated with Academic Year Employment (from Work History File)** | | | | | |
| 10 Hours | 11.4% | 3.3% | -0.8 pts. | .093 | .049 |
| 20 Hours | 17.5 | 5.7 | 0.4 | .146 | .077 |
| 40 Hours | 11.4 | 7.1 | 9.0 | .149 | .064 |
| Max. Difference | 25.0 hr | 36.5 hr | no maximum | 30.6 hr | 27.4 hr |

Note: See notes on table 12. Sample includes respondents interviewed in 1991 who have more than 12 years of education (n=534).

**Table A.1:**
**Sample Means By High School Employment Status in Week Prior to the Survey Date**

| | Sophomore Hours | | Junior Hours | | Senior Hours | |
|---|---|---|---|---|---|---|
| | 0 | > 0 | 0 | > 0 | 0 | > 0 |
| Demographic Characteristics | | | | | | |
| Female | 51.4% | 42.5% | 52.2% | 44.7% | 49.5% | 48.3% |
| Black | 14.4 | 4.3 | 16.7 | 4.8 | 17.3 | 5.9 |
| Hispanic (Nonblack) | 6.7 | 5.3 | 6.0 | 6.7 | 6.5 | 6.1 |
| Foreign Language Spoken in Home | 11.2 | 11.3 | 11.9 | 10.4 | 12.2 | 10.3 |
| Foreign Born | 2.7 | 2.7 | 2.0 | 3.7 | 2.5 | 3.0 |
| Number of Siblings | 3.1 | 2.9 | 3.1 | 2.9 | 3.1 | 2.9 |
| Education | | | | | | |
| Attends Public School | 92.4 | 93.7 | 93.7 | 91.6 | 93.1 | 92.4 |
| Negative Attitude Towards School | 15.8 | 14.0 | 17.1 | 13.0 | 17.5 | 13.1 |
| Highest Grade Expected | 14.3 | 14.3 | 14.2 | 14.5 | 14.3 | 14.4 |
| AFQT Score (1991) | 44.0 | 50.9 | 43.5 | 49.1 | 42.7 | 49.1 |
| Household Resources at Age 14 | | | | | | |
| Magazine | 72.5 | 77.7 | 71.8 | 76.9 | 69.7 | 78.0 |
| Newspapers | 83.1 | 87.4 | 82.3 | 87.0 | 82.3 | 86.3 |
| Library Card | 71.4 | 81.1 | 71.0 | 78.2 | 67.8 | 80.3 |
| Drug Use | | | | | | |
| Used Cigarettes By Sophomore Year | 61.4 | 65.1 | 61.1 | 64.2 | 59.8 | 64.9 |
| Used Marijuana By Sophomore Year | 8.0 | 7.6 | 8.4 | 7.1 | 7.8 | 7.9 |
| Religion | | | | | | |
| Baptist | 19.6 | 14.6 | 20.7 | 14.9 | 21.7 | 14.8 |
| Catholic | 31.3 | 39.5 | 29.8 | 38.7 | 29.9 | 37.3 |
| Jewish | 1.0 | 1.0 | 0.7 | 1.5 | 1.0 | 1.1 |
| Characteristics of Mother | | | | | | |
| Foreign Born | 6.7 | 5.0 | 6.3 | 6.0 | 5.5 | 6.8 |
| High School Graduate | 57.8 | 61.5 | 54.1 | 65.0 | 54.5 | 63.1 |
| College Graduate | 10.1 | 12.6 | 10.8 | 10.8 | 10.3 | 11.3 |
| Characteristics of Father | | | | | | |
| Foreign Born | 6.0 | 5.3 | 5.0 | 6.9 | 5.3 | 6.3 |
| High School Graduate | 48.6 | 50.5 | 44.9 | 54.6 | 43.0 | 55.0 |
| College Graduate | 18.0 | 19.3 | 18.9 | 17.7 | 17.9 | 18.8 |
| N | 766 | 301 | 604 | 463 | 525 | 542 |

Note: Sample includes respondents interviewed in 1991.

**Table A.2:**
**Coefficients from Regression of of Log Earnings on High School Employment Hours and Covariates**

| Regressor | Regression Coefficient | Absolute Value of T-Statistic |
|---|---|---|
| Sophomore in 1979 | .0478 | (0.81) |
| Ethnic Status: Black | -.2756 | (2.37) |
| Hispanic | -.1396 | (0.85) |
| Female | -.5398 | (9.08) |
| Married | -.0236 | (0.36) |
| Resides in: Northeast | .1857 | (1.81) |
| Northcentral | .0502 | (0.54) |
| South | .1981 | (2.11) |
| SMSA | -.0916 | (0.95) |
| Urban Area | .1423 | (1.43) |
| Local Unemployment Rate: <3% | 2.0889 | (6.82) |
| 3-6% | 1.7228 | (7.33) |
| 6-9% | 1.4293 | (6.10) |
| 9-12% | 1.3110 | (5.15) |
| >12% | 1.0680 | (2.82) |
| Respondent is Foreign Born | -.1240 | (0.57) |
| Mother is Foreign Born | .1902 | (1.15) |
| Father is Foreign Born | .1119 | (0.69) |
| Foreign Language Spoken in the Home | .0305 | (0.23) |
| Mother's Education: High School Dropout | -.1800 | (1.18) |
| High School Graduate | -.0978 | (0.66) |
| College Graduate | -.1585 | (0.92) |
| Father's Education: High School Dropout | .2249 | (1.74) |
| High School Graduate | .1964 | (1.56) |
| College Graduate | .1823 | (1.27) |
| Magazines in Home (at 14) | -.0057 | (0.08) |
| Newspaper in Home (at 14) | .0278 | (0.32) |
| Library Card in Home (at 14) | -.0664 | (0.92) |
| Number of Siblings | .0178 | (1.15) |
| Attends Public School (1979) | -.1571 | (1.29) |
| Educational Expectations | .0348 | (2.09) |
| Negative Attitude Concerning School | -.1440 | (1.74) |
| Religion: Baptist | -.0168 | (0.20) |
| Catholic | -.0154 | (0.21) |
| Jewish | .0217 | (0.08) |
| Has Smoked Cigarette (by Sophomore Year) | -.0482 | (0.78) |
| Marijuana/Hashish Use (by Sophomore Year) | -.0717 | (0.65) |
| Natural Log of Ave. Family Income | .1520 | (2.44) |
| AFQT Score (1981) | .0049 | (3.40) |

Note: The dependent variable is the natural log of average annual earnings in 1988 through 1990. Work hours and hours squared in the week prior to the sophomore, junior, and senior year (of high school) interviews also controlled for. These coefficients are shown in specification (e) of the top panel of table 7.

**Table A.3:**
**Regression and Ordered Probit Estimates of Log Earnings, Duncan Scores,and Fringe Benefits for Respondents Never Attending College**

| Type of Employment | Annual Earnings | Hourly Wages | Duncan Occupation Index | Employer Health Insurance | Employer Pension Plan |
|---|---|---|---|---|---|
| **Employment Hours in Week Prior to Survey Date** | | | | | |
| Sophomore Hours | -.0104 | -.0049 | -.0091 | .0272 | .0080 |
| Hours Squared | 2.3E-4 | 1.1E-4 | -.0053 | -6.0E-4 | -3.8E-4 |
| P-Value | [.755] | [.860] | [.121] | [.325] | [.668] |
| Junior Hours | .0046 | .0026 | -.0682 | -.0055 | -.0121 |
| Hours Squared | 1.4E-4 | -8.3E-5 | .0042 | 3.8E-4 | -2.1E-4 |
| P-Value | [.952] | [.962] | [.741] | [.711] | [.581] |
| Senior Hours | .0232 | .1263 | .4407 | .0076 | .0197 |
| Hours Squared | -4.0E-4 | -2.1E-4 | -.0064 | -7.3E-6 | -4.7E-4 |
| P-Value | [.033] | [.077] | [.001] | [.443] | [.271] |
| **Academic Year Employment Hours (From Work History File)** | | | | | |
| Junior Hours | .0170 | .0120 | .2180 | -.0168 | -.0131 |
| Hours Squared | -9.4E-4 | -7.0E-4 | -.0080 | 3.1E-4 | 5.4E-4 |
| P-Value | [.089] | [.025] | [.608] | [.507] | [.680] |
| Senior Hours | .0088 | .0039 | .5151 | .0194 | .0205 |
| Hours Squared | 8.7E-5 | 8.4E-5 | -.0076 | -1.6E-4 | -3.6E-4 |
| P-Value | [.039] | [.059] | [.000] | [.061] | [.214] |

Note: See notes on tables 7 and 10. Sample includes respondents interviewed in 1991 who have less than 13 years of education.

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